Docket No. 483018016US1
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of: Sukhman et al.	Confirmation No. 7240
Application No.: 10/788,642	Art Unit: 2828
Filed: February 27, 2004	
For: **METHOD AND APPARATUS FOR COOLING A LASER**	Examiner: D. R. Forde

APPEAL BRIEF

MS Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Madam:

As required under 37 C.F.R. § 41.37(a), this brief is filed in furtherance of the Notice of Appeal filed in this case on May 28, 2009.

The fees required under 37 C.F.R. § 41.20(b)(2) are dealt with in the accompanying TRANSMITTAL OF APPEAL BRIEF.

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I. REAL PARTY IN INTEREST

The real party in interest for this appeal is Universal Laser Systems, Inc. of Scottsdale, Arizona.

II. RELATED APPEALS AND INTERFERENCES

Neither Appellant, Appellant's legal representative, nor the above-identified Assignee are aware of other appeals or interferences that are related to, will directly affect or be directly affected by or have a bearing on the Board's decision in the present appeal.

III. STATUS OF CLAIMS

A. Total Number of Claims in Application

There are 23 claims pending in application.

B. Current Status of Claims

1. Claims pending: 1-23
2. Claims allowed: None
3. Claims rejected: 1-23
4. Claims cancelled: None
5. Claims withdrawn from consideration but not canceled: None

C. Claims On Appeal

The claims on appeal are claims 1-23

IV. STATUS OF AMENDMENTS

No amendments have been filed subsequent to a Final Office Action mailed April 15, 2009.

V. SUMMARY OF CLAIMED SUBJECT MATTER

A. Overview of Appellants' Technology

Appellants' technology is directed to methods and systems for cooling lasers. Lasers and their components generate a significant amount of heat during operation and require cooling to prevent overheating. (Specification at [0005].) One conventional method of cooling lasers is flowing or passing air over the various laser components. Such arrangements generally include flowing air along multiple paths through the laser. The paths are designed to split the air flows in any desired ratio. For example, 50% of the total air flow may be used along a first path, and the other 50% may be used along a second path. (Specification at [0008].) The ratios can vary depending upon the particular laser system and its arrangement. Splitting the air flow to cool the various laser components, however, provides less total air flow to the individual components and thereby increases the total time and energy required to effectively cool the laser. (Specification at [0009].) In addition, the split air flow within a conventional laser system is generally non-symmetrical, which can cause undesirable deformations (e.g., twisting, bowing, etc.) of the laser components during operation and can result in optical misalignment of the laser source. (Specification at [0009].)

Appellants' technology provides a laser system having a laser source and a power source arranged in series along a longitudinal axis of the laser system. A fan within the laser system is configured to direct air flow along a single air channel and generally parallel with the longitudinal axis. The fan is configured to pull or, alternatively, push air through the laser system to cool the laser source and power source in series. In one embodiment, for example, the laser source is cooled first, and the subsequent air flow (although slightly warmer from cooling the laser source) is then used to cool the power source. (Specification at [0015].) Several embodiments of Appellants' technology accordingly resolve the foregoing drawbacks associated with conventional laser systems by providing a compact laser system in which a single, generally symmetric air flow is used to cool the laser and its components.

B. Independent Claims on Appeal

Each independent claim being appealed is paraphrased below, with citations to the corresponding portions of the specification and drawings as required by 37 C.F.R. § 41.37(c)(1)(v). These citations are provided in order to illustrate specific examples and embodiments of the recited claim language, and are not intended to limit the claims.

1. Independent Claim 1

Independent claim 1 is directed to a laser 20 comprising a laser source 22, a power source 30, and a fan 40 for generating an air flow 44. (Specification at [0013], [0027], [0029], and [0032], and Figure 2.) The power source 30 is configured to cause the laser source 22 to generate a laser beam and is configured to provide excitation energy for a lasing medium. (Specification at [0013], [0027], and [0029].) The laser source 22 and the power source 30 each have an exterior surface. The laser source 22 and the power source 30 are arranged in an end-to-end series relation along a longitudinal axis 50 such that the fan 40 directs the airflow 44 generally parallel with the longitudinal axis 50 to pass first adjacent to the exterior surface of the laser source 22 for cooling the laser source 22, and then to pass adjacent to the exterior surface of the power source 30 for cooling the power source 30. (Specification at [0013]-[0015] and [0029]-[0034], and Figures 2-4.)

2. Independent Claim 7

Independent claim 7 is directed to a laser 20 having a laser source 22 with a first end 34 and a second end 36 spaced apart from the first end 34 along a longitudinal axis 50. (Specification at [0013], [0027], and [0029], and Figure 2.) The laser 20 also includes a laser resonator, a laser media, and electrodes for exciting the laser media. (Specification at [0013] and [0027], and Figure 2.) The laser 20 further includes a power source 30 at least proximate to one of the first or second ends 34 and 36 of the laser source 22 such that the power source 30 and the laser source 22 are aligned along a longitudinal axis 50 of the laser 20. (Specification at [0013], [0027], and [0029], and Figures 2-4.) The power source 30 is configured to provide excitation energy to the electrodes and cause the laser source 22 to generate a laser beam from the other one

of the first or second ends. (Specification at [0013], [0027], and [0029].) The laser 20 of claim 7 further includes a cooling fan 40 positioned adjacent to the power source 30 and located in a generally straight line path with the laser source 22 and the power source 30 along the longitudinal axis 50. (Specification at [0013], [0015], and [0032], and Figures 2-4.)

3. Independent Claim 15

Independent claim 15 is directed to a laser 20 comprising a laser source 22 and a power source 30 at least proximate to the laser source 22. (Specification at [0013], [0027], and [0029], and Figure 2.) The power source 30 is configured to provide excitation energy for a lasing medium of the laser source 22 to generate a laser beam. (Specification at [0013] and [0027], and Figure 2.) The laser 20 also includes a cooling fan 40 at one end of the power source 22. (Specification at [0013], [0015], [0029], and [0032], and Figures 2-4.) The cooling fan 40 is adapted for generating an air flow 44 directed in a generally straight line path with the laser source 22 and the power source 30 for cooling the laser 20 and power sources. (Specification at [0013]-[0015] and [0032]-[0034], and Figures 2-4.)

4. Independent Claim 23

Independent claim 23 is directed to a laser 20 having a laser source 22 with a first end 34 and a second end 36 spaced apart from the first end 34 along a longitudinal axis 50. (Specification at [0013], [0027], and [0029], and Figure 2.) The laser 20 also includes a laser resonator, a laser media, and electrodes for exciting the laser media. (Specification at [0013] and [0027], and Figure 2.) The laser 20 further includes a power source 30 at least proximate to one of the first or second ends 34 and 36 of the laser source 22 such that the power source 30 and the laser source 22 are aligned along a longitudinal axis 50 of the laser 20. (Specification at [0013], [0027], and [0029], and Figures 2-4.) The power source 30 is configured to provide excitation energy to the electrodes and cause the laser source 22 to generate a laser beam. (Specification at [0013], [0027], and [0029].) The laser 20 of claim 23 further includes a cooling fan 40 positioned adjacent to the power source 30 and located in a generally straight line path

with the laser source 22 and the power source 30 along the longitudinal axis 50. (Specification at [0013], [0015], and [0032], and Figures 2-4.) The cooling fan 40 is adapted for generating an air flow 44 directed in a generally straight line path with the laser source 22 and the power source 30 for cooling the laser 20 and power sources. (Specification at [0013]-[0015] and [0032]-[0034], and Figures 2-4.)

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A. The Examiner's Rejections

The Examiner's rejections in the Final Office Action are as follows:

1. Claims 1-5 were rejected under 35 U.S.C. § 103(a) over the combination of U.S. Patent App. Pub. No. US 2003/0021312 to Gruzdev et al. ("Gruzdev"), U.S. Patent No. 4,953,176 to Ekstrand ("Ekstrand"), and U.S. Patent No. 4,805,177 to Martin et al. ("Martin").

2. Claims 6, 14 and 22 were rejected under 35 U.S.C. § 103(a) over the combination of Gruzdev, Ekstrand, Martin, and U.S. Patent No. 5,550,853 to Ostler ("Ostler").

3. Claims 7-13 and 23 were rejected under 35 U.S.C. § 103(a) over the combination of Gruzdev, Ekstrand, Martin, and Ostler.

4. Claims 15 and 17-21 were rejected under 35 U.S.C. § 103(a) over the combination of Gruzdev and Martin.

B. The Issues on Appeal

1. Is the rejection of claims 1-5 under 35 U.S.C. § 103(a) over the combination of Gruzdev, Ekstrand, and Martin proper?

2. Is the rejection of claims 6, 14 and 22 under 35 U.S.C. § 103(a) over the combination of Gruzdev, Ekstrand, Martin, and Ostler proper?

3. Is the rejection of claims 7-13 and 23 under 35 U.S.C. § 103(a) over the combination of Gruzdev, Ekstrand, Martin, and Ostler proper?

4. Is the rejection of claims 15 and 17-21 under 35 U.S.C. § 103(a) over the combination of Gruzdev and Martin proper?

VII. ARGUMENTS

A. Legal Standard for Obviousness

Claims 1-23 on appeal stand rejected as being obvious under 35 U.S.C. § 103(a), which provides:

> A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The Supreme Court has provided the following guidance in applying Section 103. In *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966), the Court stated:

> Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined.

More recently, the Supreme Court reaffirmed the holdings of *Graham* and clarified several aspects of the manner in which obviousness should be determined (*KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727 (2007)). First, "[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results," but "when the prior art teaches away from combining certain known elements, discovery of a successful means of combining them is more likely to be nonobvious." (Id. at 1739-40). Second, "a patent composed of

several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art"; rather, "it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does" (Id. at 1741). The Court recognized that many significant advances will combine familiar elements: "inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known." (Id.)

Following the Supreme Court decision in *KSR*, the United States Patent and Trademark Office ("USPTO") issued a memorandum to all Examiners. The memorandum directs Examiners to continue to determine why a person of ordinary skill in the art would make the combination: "in formulating a rejection under 35 U.S.C. § 103(a) based upon a combination of prior art elements, it remains necessary to identify the reason why a person of ordinary skill in the art would have combined the prior art elements in the manner claimed." (USPTO Memorandum, Supreme Court decision on *KSR Int'l. Co. v. Teleflex, Inc.*, May 3, 2007, p. 2.)

Furthermore, references cannot be combined where references teach away from their combination since it is improper to combine references where the references teach away from their combination. (*In re Grasselli*, 713 F.2d 731, 743, 218 USPQ 769, 779 (Fed. Cir. 1983).)

Under the *Graham* standards as clarified by *KSR*, Appellants' invention is not obvious. For at least the reasons explained below, the Examiner has failed to satisfy her burden of presenting a *prima facie* of obviousness because the Examiner has not identified references that disclose or suggest all the elements of pending claims 1-23. Furthermore, the Examiner has not identified an apparent reason or motivation to combine the cited references in the manner recited in each of Appellant's claims. Therefore, the rejections of these claims under 35 U.S.C. § 103(a) should be reversed.

B. The Applied References

1. U.S. Patent App. Pub. No. US 2003/0021312 (Gruzdev)

Gruzdev is directed toward a portable, hand-held laser device including a laser emitter 511 and two exciting lamps 520 and 521 disposed on opposite sides of a laser rod 518. A jacket 519 made of an optically transparent material is disposed along an exterior surface of the laser rod 518. A continuous internal spiral groove 517 is formed within a body of the jacket 519. The internal spiral groove is configured to receive a cooling liquid and pass it along an exterior surface 515 of the laser rod. To increase the volume of available liquid cooling and to further intensify the cooling process, the internal spiral groove 517 is in fluid communication with a buffer space 548 also filled with the liquid coolant. A conventional rotational arrangement, such as an electric motor 525 provided with a magnetic clutch, for example, generate[s] rotational motion of the jacket 519 including the internal spiral groove 517 relative to the laser rod 518. (Gruzdev, paragraph [0040].)

2. U.S. Patent No. 4,953,176 (Ekstrand)

Ekstrand is directed toward an air-cooled ion laser including a ceramic plasma tube 10 that encloses a plasma gain medium along an optical path 11. A fan 21 positioned adjacent and generally normal to the tube 10 draws a cooling medium across a plurality of cooling fins 20 to remove heat from the tube 10. (Ekstrand, col. 3, lines 4-6.) Ekstrand discloses that if the fan directions were reversed to blow cool air onto the cooling fins rather than to draw cool air across them, the symmetry of the cooling fins would be adjusted accordingly. (Ekstrand, col. 4, lines 11-14). Ekstrand does not disclose a power source for the fan 21.

3. U.S. Patent No. 4,805,177 (Martin)

Martin is directed toward a laser device having a side pumped laser medium or crystal. Referring to Figure 1, Martin discloses a diode pumped laser device 10 including a heat sink member 12 having a shelf 14 and an adjacent wall 16. A laser medium or crystal 18 is mounted on the shelf 14 and against the wall 16. The laser medium 18 is generally a rod of material, such as neodymium YAG (yitrium aluminum

garnet). The heat sink member 12 is mounted on a thermoelectric cooler member 26, which is in turn thermally attached to a surface 27 of a larger heat sink member 28. The heat sink member 28 includes a plurality of metal fins 30 projecting away from the heat sink member 28. A fan 32 is positioned to below the device 10 to direct cooling air toward the metal fins 30 and the heat sink member 28.

Martin also discloses a pump source section having a pump source or diode array 34 positioned to produce side pumping of the laser medium or crystal 18. The pump source 34 is a single row or array of laser diodes made up of a plurality of adjacent individual diodes mounted on a conductive base member 35. The base member 35 is mounted on a heat sink member 36, which is in turn mounted on another thermoelectric cooler 38. The thermoelectric cooler 38 is mounted to the surface 27 of the heat sink member 28 and spaced apart from the thermoelectric cooler 26 of the laser source section.

4. U.S. Patent No. 5,550,853 (Ostler)

Ostler is directed toward an integral laser head and power supply system. Referring to Figures 2 and 4, Ostler discloses a laser head 42 in a plasma tube 50, an anode 60 at one end of the laser head 42, and a cathode 102 at another end of the laser head 42. The laser head 42 produces a beam 12 that passes through an output port 15. Ostler further discloses a power supply heat sink 62 encircling the anode 60 near the end of the laser head 42 where the output port 14 is located. The heat sink 62 is associated with a power supply that is "not shown." (Ostler, column 4, lines 55 and 56.) Ostler further discloses a laser head heat sink 72 positioned circumferentially around the anode end 46 of the plasma tube 50 between the power supply heat sink 62 and the plasma tube 50. Referring to Figure 2, it appears that the power supply heat sink 62 surrounds the laser head heat sink 72 such that they are separated by a small air gap 74. Given the disclosed configuration, the likely location for the "not shown" power supply in Ostler is offset to one side of the longitudinal axis of the anode 60 such that it contacts an outer portion of the power supply heat sink 62.

C. Discussion of the Issues

1. The Section 103(a) Rejection of Claims 1-5 over the Combination of Gruzdev, Ekstrand, and Martin is Improper

Claims 1-5 stand rejected under 35 U.S.C. § 103(a) over the combination Gruzdev, Ekstrand, and Martin. As set forth in detail below, the applied references Gruzdev, Ekstrand, and Martin fail to support a *prima facie* case for rejecting claims 1-5 under Section 103 for at least the reason that the applied references fail to teach or suggest all the recited features of these claims. Moreover, a person of ordinary skill in the art would not be motivated to combine the teachings of Gruzdev, Ekstrand, and Martin.

a. Claims 1 to 5

i. The Examiner has Failed to Show how the Combination of Gruzdev, Ekstrand, and Martin Teaches or Suggests all of the Recited Features of Claims 1-5, and has Thereby Failed to Establish a *Prima Facie* Case of Obviousness

Independent claim 1 recites, *inter alia*, a laser source and a power source arranged in an end-to-end series relation along a longitudinal axis such that the fan directs the air flow generally parallel with the longitudinal axis to pass (a) first adjacent to the laser source, and then (b) to pass adjacent to the power source. The claimed power source is configured to provide excitation energy for a lasing medium. The Examiner correctly acknowledges in the Final Office Action that Gruzdev fails to disclose a laser source and a power source arranged an in end-to-end series relation along a longitudinal axis as recited in claim 1. (Final Office Action, pg. 3.) To cure the deficiencies of Gruzdev, however, the Examiner incorrectly relies on Ekstrand and Martin.

Ekstrand and Martin fail to cure the deficiencies of Gruzdev to support a Section 103 rejection of claim 1. Ekstrand, for example, is relied on by the Examiner for disclosing a device with a fan that allegedly directs air flow generally parallel with a longitudinal axis of the device. (Final Office Action, pg. 3.) The Appellants respectfully

submit that this is not correct. Indeed, contrary to the Examiner's assertion in the Final Office Action, the arrangement of Ekstrand is opposite to the claimed arrangement. Referring to Figures 1 and 2 of Ekstrand, for example, this reference specifically discloses one or more fans (e.g., fan 21 and fans 32 and 33 of Figures 1 and 2 of Ekstrand) configured to direct air flow perpendicular to a longitudinal axis of the laser. In Figure 2, for example, the fans 32 and 33 are positioned to direct air along the X and Y axes. Based on the Appellants review of this reference, however, the longitudinal axis of Ekstrand's laser would be along a Z axis (not shown) transverse to the X and Y axes and coming up directly away from the page. Nowhere does Ekstrand disclose or suggest fans positioned to direct the air flow generally parallel with the longitudinal axis of the laser, as recited in claim 1. Furthermore, based on the Appellant's review of Ekstrand, this reference never mentions the laser power source for the ionized gas in the plasma tube. The power source is not shown in any of the figures in Ekstrand's disclosure.

Martin also fails to cure the deficiencies of Gruzdev and Ekstrand to support a Section 103 rejection of claim 1. Martin is only relied on by the Examiner for disclosing a power source. More specifically, the Examiner alleges that it would have been obvious to modify Gruzdev to include the power source of Martin "because a pump source or diode array is positioned to produce side pumping of the laser." (Final Office Action, pg. 4.) The Appellants respectfully submit that this is not correct. For example, the power source for Gruzdev's laser is the exciting lamps 520 and 521, which are situated parallel to the laser medium (i.e., the laser rod 518). The exciting lamps 520 and 521 are typically powered by a high voltage DC supply located apart from the device (and not shown or mentioned in the disclosure of Gruzdev).

In contrast with the Gruzdev's hand-held, portable laser device, Martin is directed to a diode pumped laser device 10 with a pump source section having a pump source or diode array 34 positioned to produce side pumping of the laser medium or crystal 18. The pump source 34 is a single row or array of laser diodes made up of a plurality of adjacent individual diodes mounted on a conductive base member 35. The Appellants respectfully submit that Martin's pump source 34 is entirely unsuitable for use with

Gruzdev's device. The Examiner has not provided any explanation how such a modification could be achieved, or identified an apparent reason or motivation to modify Gruzdev's hand-held laser device in such a way.

Even assuming for the sake of argument that (a) Gruzdev's laser rod 518 corresponds to the claimed laser source, and (b) Gruzdev's exciting lamps 520 and 521 correspond to the claimed power source and could be replaced with the diode array 34 of Martin (which the Appellants expressly do not concede), the arrangement of such a device still does not correspond to the arrangement of the laser of claim 1. For example, the fan 530 in the cooling arrangement 510 of Figure 5 of Gruzdev directs air flow first over the electric motor 525 and then through apertures 527 and 529 and out of the cooling arrangement 510. The air flow accordingly cools the exciting lamps 520 and 521 (the Examiner's alleged "power source") and the laser rod 518 (the Examiner's alleged "laser source") simultaneously. In direct contrast, the laser of claim 1 recites a laser source and a power source arranged in an end-to-end series relation along a longitudinal axis such that the fan directs the air flow generally parallel with the longitudinal axis to pass (a) first adjacent to the laser source, and then (b) to pass adjacent to the power source.

The Examiner's proposed combination of Gruzdev, Ekstrand, and Martin accordingly fails to meet the basic criteria defining even a *prima facie* basis for a Section 103 rejection because these references, individually and/or in combination, fail to teach or suggest all the features of claim 1. Accordingly, for at least the foregoing reasons, the Section 103 rejection of claim 1 over Gruzdev, Ekstrand, and Martin should be reversed.

ii. The Examiner has Failed to Show that There is an Apparent Rational Reason to Combine Gruzdev, Ekstrand, and Martin, and has Thereby Failed to Establish a *Prima Facie* Case of Obviousness

In addition to the requirement that the applied references teach or suggest all the claimed features, the M.P.E.P. also states that obviousness is "established by combining or modifying the teachings of the prior art to produce the claimed invention

where there is some teaching, suggestion, or motivation to do so." (M.P.E.P. § 2143.01; emphasis added.) In this regard, the Supreme Court indicated that the Examiner should show that:

> there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue . . . [and that] rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal standard of obviousness.

(*KSR*, 127 S. Ct. at 1740-41.) Moreover, in the memorandum issued by the USPTO referenced above, the USPTO has explicitly directed Examiners to "identify the reason why a person of ordinary skill in the art would have combined the prior art elements in the manner claimed."

In the present case, even assuming that the applied references teach all of the features of claim 1, which the Appellants expressly do not concede, the Examiner has not articulated an apparent reason why a person of ordinary skill in the art would have combined the Gruzdev, Ekstrand, and Martin references. The Examiner merely states that it would have been obvious "to apply the well known fan directs [sic] the air flow generally parallel with the longitudinal axis as suggested by Ekstrand to the laser of Gruzdev . . . because [it] could be used to cooling medium [sic] and if the fan directions were reversed to blow cool air onto the cooling fins, rather than to draw cool air across them and then the symmetry of [the] cooling fins would be adjusted accordingly." (Final Office Action, pgs. 3 and 4.) The Examiner further alleges that "it would have been obvious to . . . apply the well known power source as suggested by Martin to the power source of Gruzdev, because a pump or diode array is positioned to produce side pumping of the laser." (Final Office Action, pg. 4.)

Such conclusory opinions, however, do not satisfy the articulated reasoning required by case law and recent USPTO directives. It is unclear to the Appellants why one of ordinary skill in the art would have reason to combine the portable, hand-held laser device of Gruzdev with the laser systems of Ekstrand and Martin. Nor does the

Appellant understand how the systems of Gruzdev, Ekstrand, and Martin could be combined at all, not to mention how they could be combined to achieve the results posited by the Examiner. For example, the Examiner has not identified any apparent reason or motivation to modify the elaborate cooling arrangement of Gruzdev's laser device to include the arrangement of the fans in Ekstrand. The cooling arrangement 510 of Gruzdev includes rotatably moving a jacket 519 and spiral groove 517 within the jacket 519 relative to the laser rod 518. A liquid cooling medium is moved through the groove 517 and in the buffer space 548 of the assembly. An electric motor 525 is operably coupled to the jacket 519 to facilitate the rotational movement of the jacket 519 relative to the laser rod 518. (Gruzdev, [0040]–[0042].) The Appellants respectfully submit that it would require a significant reconfiguration of Gruzdev's device to come up with claimed arrangement such that a fan directs the air flow generally parallel with the longitudinal axis to pass (a) first adjacent to the laser source, and then (b) to pass adjacent to the power source. The Examiner has not provided how such a modification could be achieved, or that such a modification would provide any benefit to Gruzdev's hand-held laser device. Furthermore, such a reconfiguration is inapposite to the specific and elaborate cooling arrangements disclosed in Gruzdev. In view of the foregoing, a person of ordinary skill in the relevant art would not be motivated to combine the fans of Ekstrand with the hand-held laser device of Gruzdev to come up with the claimed combination of elements. In addition, the Examiner has not provided any apparent reason or motivation to modify or replace the laser source of Gruzdev with the diode array 34 or Martin.

Rather than articulating an apparent rational reason to modify Gruzdev according to Ekstrand and Martin to arrive at the features of claim 1, the proposed combination of references is based on hindsight using the present application as a guide. None of the reasons for modifying the hand-held laser device of Gruzdev to have the additional features of Ekstrand and Martin are provided in the references or the prior art. Instead, it appears that the Final Office Action concocted such reasons in order to come up with the claimed combination of elements based solely on the currently pending claims. Therefore, the Appellants respectfully submit that this rejection was based on

impermissible hindsight in which the claims were used as a roadmap to find features in the prior art. For at least the above reasons, the Examiner has not established a *prima facie* case of obviousness and the combination of Gruzdev, Ekstrand, and Martin cannot render independent claim 1 unpatentable. Therefore, the Section 103 rejection of claim 1 should be reversed.

Claims 2-5 depend from base claim 1. As discussed above, claim 1 is allowable. Accordingly, claims 2-5 are also allowable as depending from claim 1, and also because of the additional features of these dependent claims. Therefore, the Section 103 rejection of claims 2-5 should be reversed.

2. The Section 103(a) Rejection of Claims 6, 14 and 22 over the Combination of Gruzdev, Ekstrand, Martin, and Ostler is Improper

Claims 6, 14, and 22 stand rejected under 35 U.S.C. § 103(a) over the combination of Gruzdev, Ekstrand, Martin, and Ostler. Claim 6 depends from allowable base claim 1, claim 14 depends from allowable base claim 7, and claim 22 depends from allowable base claim 15. As discussed above, Gruzdev, Ekstrand, and Martin, either alone or in combination, fail to disclose or suggest all the features of claim 1. Ostler is relied on by the Examiner for disclosing a device with a shroud covering. (Final Office Action, pgs. 5 and 6.) Without conceding that this reference provides the teaching for which it is cited, the Appellants submit that this reference nevertheless fails to cure the above-noted deficiencies of Gruzdev, Ekstrand, and Martin to support a Section 103 rejection of claim 1. As discussed below, the combination of Gruzdev, Ekstrand, Martin, and Ostler further fails to support a Section 103 rejection of base claims 7 and 15. Accordingly, claims 6, 14, and 22 are allowable over the combination of Gruzdev, Ekstrand, Martin, and Ostler for at least the reason that these references, either alone or in combination, fail to disclose or suggest all the features of base claims 1, 7, and 15, and the additional features of dependent claim 6, 14, and 22. Therefore, the Section 103 rejection of claims 6, 14, and 22 should be reversed.

3. The Section 103(a) Rejection of Claims 7-13 and 23 over the Combination of Gruzdev, Ekstrand, Martin, and Ostler is Improper

Claims 7-13 and 23 stand rejected under 35 U.S.C. § 103(a) over the combination of Gruzdev, Ekstrand, Martin, and Ostler. Under the well established standard for a *prima facie* case of obviousness, the Examiner must (a) identify prior art references that disclose all the elements of the claims, and (b) provide a suggestion or motivation (from the prior art) to combine the references to produce the claimed invention. (M.P.E.P. § 2143.) As set forth below, the Examiner has failed to satisfy the burden of presenting a *prima facie* case of obviousness. Accordingly, the Section 103 rejection of claims 7-13 and 23 should be reversed.

a. The Examiner has Failed to Show how the Combination of Gruzdev, Ekstrand, Martin, and Ostler Teaches or Suggests all of the Recited Features of Claims 7-13 and 23, and has Thereby Failed to Establish a *Prima Facie* Case of Obviousness

As a preliminary matter, the Appellants respectfully note that the Final Office Action's discussion of the applied references does not appear to meet the Examiner's burden under 37 C.F.R. 1.104(c)(2) and M.P.E.P. § 706 of clearly explaining the pertinence of each reference. Instead of clearly explaining how the applied references particularly disclose claimed features, the Examiner merely provides a narrative summary of the references, with a cursory reference to certain claimed features. Moreover, the Examiner ignores many of the specific features of claims 7 and 23 and merely copies verbatim much of the text used in the Office Action's rejection of claim 1. In an effort to expedite prosecution, however, the Appellants have attempted to identify and address the Examiner's rejections of claims 7-13 and 23, and point out why these references fail to establish a *prima facie* case of obviousness.

i. Claims 7-13

Independent claim 7 recites, *inter alia*, a cooling fan positioned adjacent to a power source and located in a generally straight line path with a laser source and the power source along the longitudinal axis. The Examiner correctly notes in the Final

Office Action that Gruzdev fails to disclose all of the recited features. (Final Office Action, pgs. 6-8.) In an attempt to fill the voids in Gruzdev, however, the Examiner incorrectly relies on Ekstrand, Martin, and Ostler. More specifically, Ekstrand is relied on by the Examiner for disclosing a device with a fan that allegedly directs air flow generally parallel with a longitudinal axis of the device, Ostler is relied on by the Examiner for disclosing an electrode, and Martin is relied on for disclosing a power source. (Final Office Action, pgs. 7 and 8).

Gruzdev, Ekstrand, Martin, and Ostler fail to support a *prima facie* case for rejecting claim 7 under Section 103 for at least the reason that the applied references fail to disclose or suggest all the claimed features. As noted above, for example, the Examiner's rejection of claim 7 in the Final Office Action ignores many specific features of this claim and merely copies the text associated with the rejection of claim 1. For example, nowhere does the Examiner point out where the applied references disclose "a cooling fan positioned adjacent to said power source and located in a generally straight line path with said laser source and said power source along the longitudinal axis," as recited in claim 7. Based on the Appellants review of the applied references, and in contrast to the claimed arrangement, Gruzdev's fan 530 is spaced apart from the outer casing 512 of Gruzdev's device and is positioned outboard of the electric motor 525. The electric motor 525 is not "a power source at least proximate to one of the first or second ends of said laser source and . . . configured to provide excitation energy," as recited in claim 7. Rather, the motor 525 is merely an electric motor configured to rotate the jacket 519 and internal spiral groove 517 around the laser rod 518 of Gruzdev's device.

Ekstrand, Martin, and Ostler fail to cure the above-noted deficiencies to Gruzdev to support a Section 103 rejection of claim 7. For example, as discussed previously, Ekstrand specifically discloses one or more fans configured to direct air flow perpendicular to a longitudinal axis of the laser. Nowhere does Ekstrand disclose or suggest a cooling fan positioned adjacent to the power source and "located in a generally straight line path with said laser source and said power source along the longitudinal axis [of the laser]," as recited in claim 7. Martin is only relied on by the

Examiner for disclosing a power source. (Final Office Action, pg. 8.) As discussed in detail above with respect to claim 1, the Appellants respectfully submit that Martin's pump source or diode array 34 is entirely unsuitable for use with Gruzdev's device. The Examiner has not provided any explanation how such a modification could be achieved, or identified an apparent reason or motivation to modify Gruzdev's hand-held laser device in such a way.

The Examiner also asserts that it would have been obvious to "apply the well known electrode as suggested by Ostler to the laser of Gruzdev, because [it] could be used to simulate[] the laser." (Final Office Action, p. 7.) The Appellants respectfully submit that such a modification of Gruzdev's device is impracticable. For example, Gruzdev is directed to a hand-held laser device. In contrast, the electrodes of Ostler's stationary laser device are large, relatively heavy structures. A person skilled in the art would not be motivated to modify Gruzdev's compact, hand-held laser device with the large electrodes of Ostler.

The Examiner's proposed combination of Gruzdev, Ekstrand, Martin, and Ostler accordingly fails to meet the basic criteria defining even a *prima facie* basis for a Section 103 rejection because these references, individually and/or in combination, fail to teach or suggest all the features of claim 7. Accordingly, for at least the foregoing reasons, the Section 103 rejection of claim 7 over Gruzdev, Ekstrand, Martin, and Ostler should be reversed.

Claims 8-13 depend from base claim 7. As discussed above, claim 7 is allowable. Accordingly, claims 8-13 are also allowable as depending from claim 7, and also because of the additional features of these dependent claims. Therefore, the Section 103 rejection of claims 8-13 should be reversed.

ii. Claim 23

Independent claim 23 includes several features generally similar to the features of claim 7. For example, claim 23 recites, *inter alia*, "a cooling fan positioned adjacent to a power source and located in a generally straight line path with a laser source and

the power source along the longitudinal axis." Claim 23 is accordingly patentable over the combination of Gruzdev, Ekstrand, Martin, and Ostler for at least the reasons discussed above with reference to claim 7, and for the additional features of this independent claim. Therefore, the Section 103 rejection of claim 23 over Gruzdev, Ekstrand, Martin, and Ostler should be reversed.

4. The Section 103(a) Rejection of Claims 15 and 17-21 over the Combination of Gruzdev and Martin is Improper

As a preliminary matter, the Final Office Action asserts that claims 15 and 17-21 stand rejected "under 35 U.S.C. § 102(b) as being anticipated by Gruzdev et al (2003/0021312) in view of Martin et al (4,805,177)." (Final Office Action, pg. 10; emphasis added.) It appears that the reference to Section 102(b) is a typographical error. For purposes of this appeal and the arguments set forth below, the Appellants will assume that the Examiner intended to reject claims 15 and 17-21 under 35 U.S.C. § 103(a) over the combination of Gruzdev and Martin.

a. Claims 15 and 17-21

Independent claim 15 recites, *inter alia*, "a cooling fan at one end of the power source" that generates "an air flow directed in a generally straight line path with said laser source and said power source." Neither Gruzdev nor Martin teach or suggest these features. Indeed, even the Examiner admits that Gruzdev fails to teach the claimed power source. In an attempt to fill the void in Gruzdev, however, the Examiner again turns to Martin. As discussed previously, however, Martin fails in this regard. For example, as explained above, there is no suggestion or motivation to modify Gruzdev's hand-held, portable laser device to include the pump source or diode array 34 of Martin to come up with the claimed combination of features. The Appellants respectfully submit that Martin's pump source 34 is entirely unsuitable for use with Gruzdev's device. Furthermore, the Examiner has not provided any explanation how such a modification could be achieved, or identified an apparent reason or motivation to modify Gruzdev's hand-held laser device in such a way. Accordingly, for at least the foregoing

reasons, the Section 103 rejection of claim 15 over Gruzdev and Martin should be reversed.

Claims 17-21 depend from base claim 15. As discussed above, claim 15 is allowable. Accordingly, claims 17-21 are also allowable as depending from claim 15, and also because of the additional features of these dependent claims. Therefore, the Section 103 rejection of claims 17-21 should be reversed.

VIII. CONCLUSION

As discussed in detail above, the Examiner has failed to establish a prima facie case of obviousness for any of the claims on appeal for at least two reasons. First, the applied references fail to teach or suggest all the claimed features. Second, the Examiner has not identified an apparent reason or motivation to combine the applied references in the manner recited in each of the claims. Accordingly, the Appellants respectfully request reversal of the Examiner's rejections of claims 1-23.

Respectfully submitted,

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By_____
Aaron J. Poledna
Registration No.: 54,675
PERKINS COIE LLP
P.O. Box 1247
Seattle, Washington 98111-1247
(206) 359-3982
(206) 359-7198 (Fax)
Attorney for Appellant

CLAIMS APPENDIX

Claims Involved in the Appeal of Application Serial No. 10/788,642:

1. A laser, comprising:

a laser source;

a power source for causing the laser source to generate a laser beam, wherein the power source is configured to provide excitation energy for a lasing medium;

a fan for generating an air flow;

wherein the laser source and the power source each have an exterior surface; and

wherein the laser source and the power source are arranged in an end-to-end series relation along a longitudinal axis such that the fan directs the air flow generally parallel with the longitudinal axis to pass first adjacent to the exterior surface of the laser source for the cooling thereof, and then to pass adjacent to the exterior surface of the power source for subsequent cooling thereof.

2. The laser of claim 1, wherein each of the exterior surfaces of said laser source and said power source includes:

a substantially developed surface to facilitate transfer of heat to air, wherein the fan directs the air flow substantially adjacent to the developed surface of each of said laser source and said power source.

3. The laser of claim 2, wherein said developed surfaces are cooling fins.

4. The laser of claim 3, wherein said cooling fins on said laser source are profiled in a direction along the longitudinal axis of the laser.

5. The laser of claim 1, wherein said laser source and said power source have generally equal cross-sectional areas in a direction perpendicular to the longitudinal axis.

6. The laser of claim 1, further comprising:

a shroud covering said laser source and said power source, wherein said shroud includes interior walls forming a single air channel configured to direct the air flow within the shroud in a single direction from the fan along the longitudinal axis to pass substantially adjacent to the exterior surfaces of said laser source and said power source.

7. A laser, comprising:

a laser source having a first end, a second end spaced apart from a first end along a longitudinal axis, a laser resonator, a laser media, and electrodes for exciting the laser media;

a power source at least proximate to one of the first or second ends of said laser source and configured to provide excitation energy to the electrodes and cause the laser source to generate a laser beam from the other one of the first or second ends, wherein the power source and the laser source are aligned along the longitudinal axis; and

a cooling fan positioned adjacent to said power source and located in a generally straight line path with said laser source and said power source along the longitudinal axis, said cooling fan adapted for generating an air flow for cooling said laser source and said power source.

8. The laser of claim 7, wherein said cooling fan generates the air flow in a direction to cool said laser source before cooling said power source.

9. The laser of claim 7, wherein said cooling fan generates the air flow in a direction to cool said power source before cooling said laser source.

10. The laser of claim 7, wherein each of said laser source and said power source includes:

a substantially developed surface to facilitate a transfer of heat to air on a respective exterior surface, and

wherein said cooling fan directs the air flow substantially adjacent to the developed surface of each of said laser source and said power source.

11. The laser of claim 10, wherein said developed surfaces are cooling fins.

12. The laser of claim 11, wherein said cooling fins on said laser source are profiled in a direction along the longitudinal axis of the laser.

13. The laser of claim 7, wherein said laser source and said power source have generally equal cross-sectional areas in a direction perpendicular to the generally straight line path.

14. The laser of claim 7, further comprising:

a shroud for covering said laser source and said power source, with said shroud forming a single air channel for directing the air flow along the generally straight line path to pass substantially adjacent said laser source and said power source.

15. A laser, comprising:

a laser source;

a power source at least proximate to said laser source and configured to provide excitation energy for a lasing medium of the laser source to generate a laser beam; and

a cooling fan at one end of the power source, the cooling fan being adapted for generating an air flow directed in a generally straight line path with said laser source and said power source for cooling said laser source and said power source.

16. The laser of claim 15, wherein said cooling fan generates the air flow in a direction to cool said laser source before cooling said power source.

17. The laser of claim 15, wherein said cooling fan generates the air flow in a direction to cool said power source before cooling said laser source.

18. The laser of claim 15, wherein each of said laser source and said power source includes:

a substantially developed surface to facilitate transfer of heat to air on a respective exterior surface, and

wherein said cooling fan directs the air flow substantially adjacent to the developed surface of each of said laser source and said power source.

19. The laser of claim 18, wherein said developed surfaces are cooling fins.

20. The laser of claim 19, wherein said cooling fins on said laser source are profiled in a direction along the longitudinal axis of the laser.

21. The laser of claim 15, wherein said laser source and said power source have generally equal cross-sectional areas in a direction perpendicular to the generally straight line path.

22. The laser of claim 15, further comprising:

a shroud for covering said laser source and said power source, with said shroud forming a single air channel for directing the air flow along the generally straight line path to pass substantially adjacent said laser source and said power source.

23. A laser, comprising:

a laser source having a first end, a second end spaced apart from a first end along a longitudinal axis, a laser resonator, a laser media, and electrodes for exciting the laser media;

a power source at least proximate to one of the first or second ends of the laser source and configured to provide excitation energy to the electrodes and cause the laser source to generate a laser beam, wherein the power source and the laser source are aligned along the longitudinal axis; and

a cooling fan positioned adjacent to the power source and in a generally straight line path with the laser source and the power source along the longitudinal axis, wherein the cooling fan is adapted for generating an air flow for cooling the laser source and the power source.

EVIDENCE APPENDIX

None.

RELATED PROCEEDINGS APPENDIX

None.